With a tight deadline and an even tighter budget, the crew from Noble Coatings and Roofing — as well as a manufacturer's representative from Volatile Free Incorporated (VFI) — teamed up to convince a school district that using a hybrid polyurea roofing system would not only help protect the environment, it would also protect the district's economic bottom line.

Two Kinds of "Green"

An 18-Year-Old Roof Gets A Seamless Face Lift

BY SYNDEE HOLT

School was out for the summer. No students. No teachers. No rest for George Zeock, Senior Facility Manager for the Allegan Area Educational Service Agency in Allegan, Michigan. Although everyone else was on summer vacation, Zeock was faced with a challenge — he needed to replace an aging roof for Allegan's Technical School. The 80,000 square foot, single-ply membrane roofing was 18 years old and had exceeded its warranty. The pitched-to-drain, roof had not leaked — yet — and the facility wanted to keep it that way. But, as with most school districts, the budget was tight. The first estimate the facility had received for a new, non-sustainable roof replacement was close to $685,000 — well over the district budget.

Zeock, who has an engineering background, saw an opportunity for change. Realizing that there were new, more environmentally-conscious technologies on the market that might better fit his budget, he consulted with Dave Chwalibog, president of the Avrie Group, Inc. "The Avrie Group specializes in environmentally friendly, sustainable roofing systems, and we had consulted with many Michigan school districts, including schools in Jackson, Michigan, two hours from Zeock's school," Chwalibog explains. He notes that the Avrie Group has provided comprehensive building site consulting and building envelope expertise using the most modern technologies for over 11 years.

After viewing the Technical School's existing roof, Chwalibog suggested that new sustainable seamless roof technologies using hybrid polyureas be explored for this project. "I not only took samples of the existing roof membrane for testing, and prepared the specs for bidding, I also provided on-site management of the project through completion," recounts Chwalibog, a registered roof observer through Roof Consultant Institute. "When you test the existing roof membrane, you are actually testing for tensile strength of the existing membrane to make sure that it's got strength enough to withstand another 10 years of serviceable life that can be utilized."

But just what was this new technology? Before any work could begin, Chwalibog would have to explain — and prove — the benefits of hybrid polyureas to Zeock and the school district. Enter Tom Holsen and Volatile Free Incorporated (VFI), manufacturers of the Seamless Sustainable Roof Coatings System being considered for the project.

THE WORLD OF POLYUREA HYBRIDS

Hybrid polyureas are a combination of pure polyurea and polyurethane, designed to provide the best of both worlds. As Holsen explains, "Pure polyurea has a lightening-fast cure rate and typically has a small shrinkage factor. This shrinkage factor is useful for coating metals and concrete, but a more flexible material is needed for roofing, which has to expand and contract with environmental variants of the substrate. The hybrid polyurea provides this flexibility."

The hybrid polyurea has several advantages over traditional

Any drain or vent covers were removed and individually coated with the VFI-540 aluminum polyurea elastomeric topcoat (*left*). When replaced on top of the drains, the protected covers seamlessly blended in with the rest of the roof.

LEFT After several site visits to jobs in progress, followed by their own "homework," the school district awarded the bid to the Noble Coatings crew and specified VFI's Seamless Sustainable Roofing System. While original estimates for a non-sustainable roof replacement were around $680,000, the hybrid system represented a savings of $500,000 from these original estimates. In addition, the hybrid roof would also lower the school's energy expenses by reducing heating and cooling costs.

polyurethane coatings. It has a faster set/cure time under more extreme temperature/humidity conditions (-25° F to +300° F). The product can be walked on 30 seconds after application, greatly reducing the facility downtime during installation. It is a waterproof, seamless, one-coat application that can be applied to a multitude of surfaces, including overhead and vertical surfaces.

Additionally, the hybrid polyurea's "Green" factors include renewability because, often (and in the case of this job), there is no tear off of the existing substrate to go to the landfill. Low odor, 100% solids, and no volatile organic compounds (VOCs) are pluses, too. And since hybrid polyurea roofing systems have been proven to reduce heating and cooling costs, the "Green" product saves money as well as the environment.

And, this friendly hybrid will pass the harshest tests, if properly applied. It even gets an A+ for "stick-to-itiveness." Holsen notes, "Typically, a hybrid polyurea will adhere to whatever surface it comes in contact with. If the surface is not properly prepared and is contaminated with moisture, rust, or other materials, the coating will adhere to the contamination and not to the actual substrate. As long as the contaminate remains on the substrate surface all is well, but if the contaminate comes loose from the substrate, the coating will fail." The material has a fairly low tolerance for inaccurate application, so it must be applied by a contractor trained and certified in its use. Enter Bill Sleeman, owner of Noble Coatings and Roofing of Grand Rapids, Michigan.

CONTRACTOR ON A MISSION

Noble Coatings and Roofing has an excellent reputation in the construction community for their commitment to environmentally friendly, sustainable roofing. Sleeman says, "'Noble' is our one-word mission statement and we feel that it really says it all about our company's commitment to service and the environment." He continues, "We knew that the school district would be pleased with the VFI system and the 'Green' nature of the product would benefit us all."

Sleeman met with Zeock regarding the polyurea roofing product, and along with Chwalibog, the three men went to see a Noble/VFI project in progress in Jackson, Michigan. In spite of his interest in the technology, "Zeock wasn't 100 percent sold on the hybrid polyurea system in the beginning. But, he did a lot of research himself, visited the ongoing sites, and quickly became convinced that the polyurea system was the way to go," recounts Sleeman.

During the site visit, the Noble crew demonstrated how they could make a seamless roof — even wrapping the polyurea up onto the parapets and up and over the flashing metal — an area typically not included in monolithic roof coating bids.

The combination of consultant, manufacturer, and experienced coatings contractor provided the one-two-three punch

JOB AT A GLANCE

PROJECT:

Replace an 18-year-old, 80,000 sq. ft., single-ply membrane, pitched-to-drain roof with an environmentally-friendly seamless polyurea roofing system

COATINGS CONTRACTOR:

Noble Coatings and Roofing
437 Spring Avenue
Grand Rapids, MI 49503
(616) 771-0701
www.noblecoatings.com

SIZE OF COATINGS CREW:

Varied; a 10-man crew worked this project

PRIME CLIENT:

Allegan Area Education Service Agency
310 Thomas Street
Allegan, MI 49010
(269) 673-2161
www.alleganisd.org

SUBSTRATE:

Hypalon single-ply membrane

SUBSTRATE CONDITION:

Few leaks, 18 year's worth of dirt and contaminants

SIZE OF PROJECT:

80,000 sq. ft.

DURATION OF PROJECT:

2 to 3 weeks from mid-August to early September

MATERIALS/PROCESS:

- Power wash substrate using a 4,000 psi Honda power washer with hooded power washing heads
- Clean oxidized and rusted areas with CLR and entire substrate was rewashed
- Clean joints using putty knives and DeWalt grinders
- Hand-apply fleece-back butyl tape to clean joints
- Spray-apply VFI urethane primer, VFI-1005 in a single 3-5mil DFT coat using a Graco 733 airless sprayer
- Spray-apply VFI 540 top coat using a Graco Marksman plural component pump and Fusion gun

UNUSUAL FACTORS:

- Unseasonable cold weather
- Unexpected rain
- Hybrid polyurea contains no VOCs

SAFETY CONSIDERATIONS:

- Crew wore respirators with charcoal filters, 5-point harnesses and lines, goggles, long sleeves and pants
- Crew erected OSHA-approved perimeter lines 10' from the roof edges
- Crew monitored while working outside of the perimeter lines

ABOVE ▲ Although the old Hypalon single-ply roof membrane had not completely failed, the 18-year-old roofing system was in dire need of replacement. Areas had disbanded and there was a lot of oxidation as well as collected dirt and debris. Fortunately, the system had enough integrity that the Noble crew could clean, prep, and coat over it, rather than tear the entire system off of the roof.

ABOVE ▲ Since the school was unoccupied for the summer, vents and intake units did not need to be sealed off. But that also meant that the crews had to be finished well in advance of anyone — teachers, support staff, or students — returning to the building.

ABOVE ▲ Using a 4,000 psi Honda power washer equipped with a hooded power washing head, the Noble crew pressure-washed the roof with a combination of bleach and cold water. Any areas of rust were chemically treated with CLR, which was spray applied and then power washed off.

necessary to convince Zeock and the Allegan district that a hybrid polyurea roofing system was the correct answer for the Technical School's failing roof. The district ultimately awarded the project to Noble Coatings and Roofing, at a savings of $500,000 from the original estimate! This meant that not only was the district going to save 73 percent from the project's initial estimate, but they were also going to have an environmentally friendly, sustainable roof with increased energy savings.

VFI's Holsen explains, "The system can be applied to many types of roofs that are out of warranty, including ethylene propylene diene monomer (EPDM), polyvinyl chloride (PVC), Hypalon, modified bitumen, and metal roofs. The system includes a non-prorated warranty ranging from five to 20 years with the application of the proper milage. The company does a pre-inspection and final inspection on larger jobs." In addition, the product has a 56 percent solar reflection, passing 53-year QUV Accelerated Weatherometer tests due to VFI-540's aluminum flake content that repels ultraviolet (UV) rays.

AT SCHOOL — AND AT WORK — IN AUGUST

According to the specification, Noble's crew of coatings technicians were scheduled to apply VFI's Seamless Sustainable Roof Coating System VFI-540 onto the Technical School's roof, beginning in mid-August.

But before any work could begin, they had to establish safety precautions. Even though school was out for the summer, the crew used 10x10 wind screens to prevent overspray in each area where they were working. OSHA-approved perimeter lines were erected with stanchions and flags to help establish the perimeter 10 feet from the roof's edge.

When the Noble crew climbed onto the 80,000 square foot roof, they were pleased to find a Hypalon single-ply membrane that had not failed.

"Even though the Hypalon single-ply membrane had not failed, the material was over 18 years old. Happily, it had enough integrity that it didn't have to be torn off and taken to a nearby landfill," Sleeman says. But, it did have 18 years worth of accumulated debris and contamination. Tom Buckely, technical sales and service representative for VFI, performed the pre-inspection for the project. He explains, "The dirt and oxidation had caused the normally white Hypalon roof to look black."

The Noble crew donned respirators with charcoal-type filters to prevent MDI and particulate inhalation, as well as goggles, long sleeves, and pants to prevent overspray onto their skin. They also wore Miller-brand five-point harnesses outside the perimeter lines with a crew member monitoring their movements. Properly protected, they could start the surface prep process.

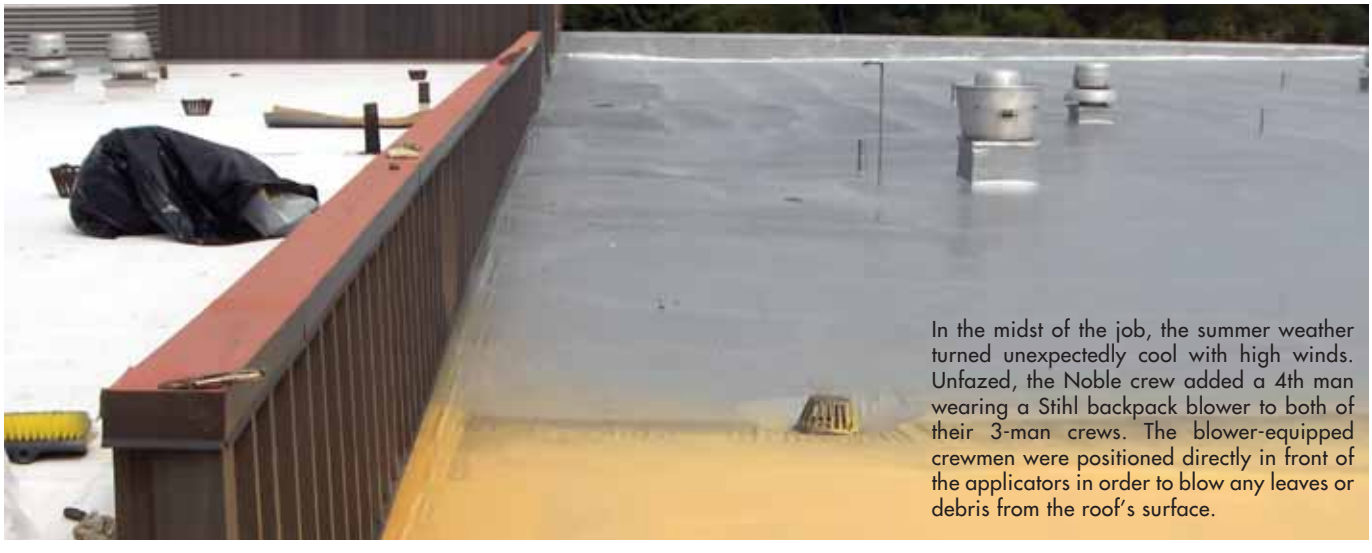
To begin, Sleeman and his 10-man crew pressure-washed the roof deck to remove the dirt and oxidation, spraying a combination of bleach and cold water through a 4,000 psi Honda power washer outfitted with a hooded power washing head. Sleeman says, "There was an area of rust contaminate that needed another chemical treat-

Not only did the Noble crew create a seamless roof, they also sprayed the polyurea over the flashing metal and onto the parapets. This extra protection created a truly monolithic seal and was an added bonus not contained in the other bids.

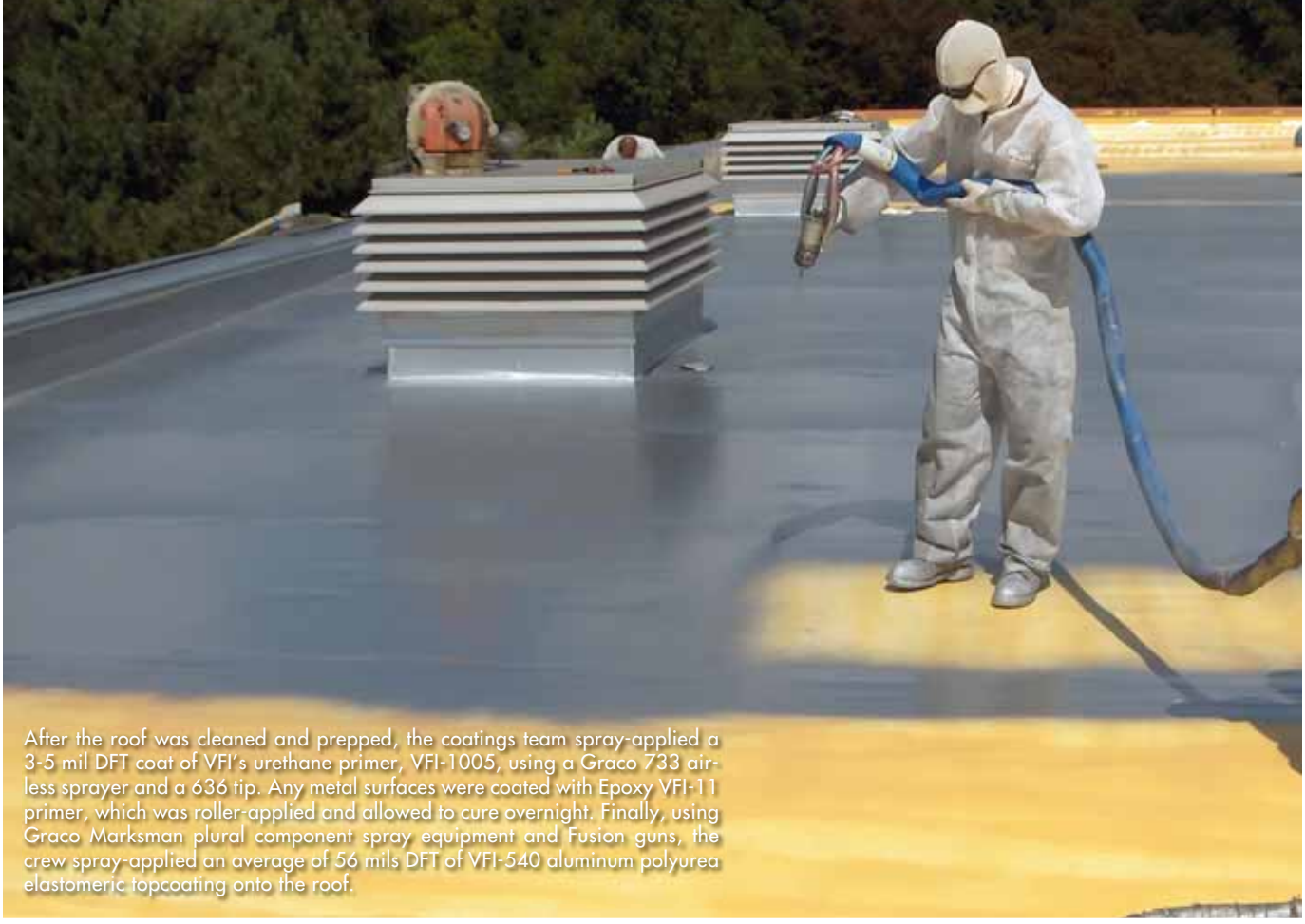
ment. CLR, a rust-remover, was applied with a sprayer, scrubbed into the surface and then power washed off. After the chemical application was completed, the treated area was whiter than the rest of the substrate area, so we re-prepped the entire roof."

The washed roof was allowed to dry for a day, while the crew tackled cleaning the 10-inch long joints that occurred every 10 feet around the perimeter of the roofing. They had to remove 18 years of caulk and sealant around the joints with putty knives and Dewalt grinders. Then they hand-applied an eight-inch-wide fleece-back butyl tape to the joints to prepare them for the sealant.

Once the substrate had dried from the pressure wash, and all the joints were cleaned and prepped, a three-man crew applied VFI's urethane primer, VFI-1005. This single-component, water-based material was applied in a single coat application of approximately three to five mils DFT (300 square feet per gallon) using a Graco 733 airless sprayer with a 636 spray tip, pumped from the ground using 150 feet of hosing. Then, Epoxy VFI-11 primer, applied by roller, was used over metal surfaces and was allowed to cure overnight, along with the VFI-1005 primer. The drying time for the water-based primer depends on the weather, although it can be applied to within five degrees of the dew point and generally takes three to five hours to dry. Since the primer is water-based, cleanup of the application equipment was completed using just water sprayed through the guns to clear any residual primer from the surfaces.



In the midst of the job, the summer weather turned unexpectedly cool with high winds. Unfazed, the Noble crew added a 4th man wearing a Stihl backpack blower to both of their 3-man crews. The blower-equipped crewmen were positioned directly in front of the applicators in order to blow any leaves or debris from the roof's surface.



After the roof was cleaned and prepped, the coatings team spray-applied a 3-5 mil DFT coat of VFI's urethane primer, VFI-1005, using a Graco 733 airless sprayer and a 636 tip. Any metal surfaces were coated with Epoxy VFI-11 primer, which was roller-applied and allowed to cure overnight. Finally, using Graco Marksman plural component spray equipment and Fusion guns, the crew spray-applied an average of 56 mils DFT of VFI-540 aluminum polyurea elastomeric topcoating onto the roof.

Next, using a Graco Marksman plural component pump with 300 feet of hose and a Fusion gun, the Noble crew spray-applied a topcoat of VFI-540 aluminum polyurea elastomer onto the primed roof deck. "We use a two-component proportioner, Graco Marksman, which is heated to about 150˚ F to 160˚ F and pressurized to 2,000 psi," describes Sleeman. The material was then pumped through pressurized hoses that maintain the heat right to the gun, keeping the air-purged components separate until released through the gun. While setting occurs in five to 10 seconds, "You can actually walk on it in about 30 seconds, so you can even work right up to rain fall during a storm," explains Buckely. An average of 56 mils of this topcoat was applied throughout the course of the project.

THE WEATHER FACTOR

The wind started picking up as the two three-man crews applied the topcoat, so a fourth man with a Stihl backpack blower was added to each crew directly ahead of the applicators to remove leaves and other wind-blown contaminants from the prepared substrate surface.

In addition, the weather turned unseasonably cool with overnight rainstorms, leaving pockets of moisture throughout the work surface. While the crews sought out and removed these moisture pools and pockets with backpack blowers and towels, the storms — and the polyurea itself — actually helped them out. Sleeman explains, "The polyurea has a tendency to blister immediately when it comes in contact with moisture, so the crews were quickly able to identify moisture areas, cut them out and reapply the polyurea to maintain the seamless quality of the coating."

Cleanup is very easy with this VFI-540 topcoat product. Even so, "You need to be trained in product use, so that the equipment stays in working condition," cautions Buckely. The Graco Marksman sprayer is self-cleaning, plus self-purging and the materials remain in the separate self-contained hoses that are stored and ready for use at the next application site.

A SEAMLESS TEAM LEADS TO A SEAMLESS ROOF

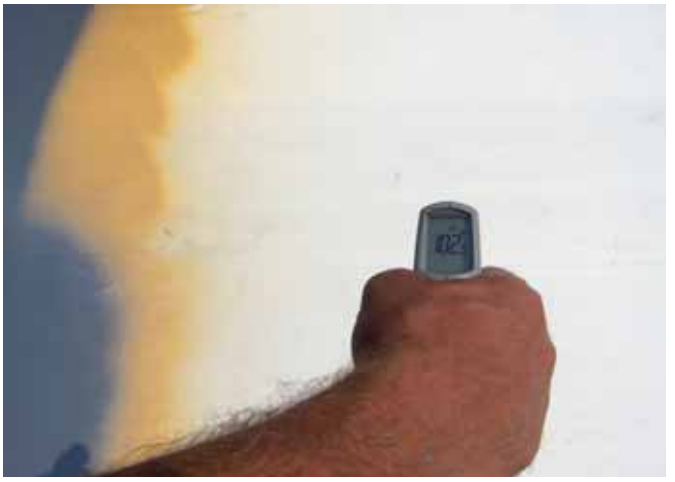
The school district was thrilled to have their new seamless roof that makes both a positive statement for the environment and a positive statement for their budget — two kinds of "Green" we most like to see!

As Tom Holsen puts it, "The enormous savings to the school district, the long-term benefits to our environment, and the expert installation were due to the facility managers' diligent work and determination to become fully educated on sustainable roofing. He then did the leg work to align with a respected roofing consultant, an experienced product representative, and a committed expert installer."

Even though school was out for the summer, everyone working on the Allegen Technical School's roof learned an important lesson — protecting the environment and protecting the economic bottom line are not mutually exclusive goals.

And, thanks to a facility manager willing to do his homework and a crew of coatings applicators willing to become educators, the Technical School's students and staff will continue to learn and to teach in a safe, comfortable — and Green — environment. CP

ABOVE ▲ Prior to coating, the temperature reading on the cleaned Hypalon substrate was 126˚F. This meant that the heat pounding down on the roof was also penetrating into the building, raising the interior temperature and creating higher air conditioning bills.



ABOVE ▲ A temperature reading, taken after the VFI-1005 urethane primer had been applied, read 102.5˚F — a difference of 23.5 degrees with the primer alone.

ABOVE ▲ Following the application of the VFI-540 aluminum polyurea elastomeric topcoat, a rooftop temperature measurement read 96.5˚F. This means that the new roof will help to keep the building's interior cooler in summer and warmer in winter. Also, the topcoat's aluminum flake content will reflect 56% of ultra-violet (UV) rays as proven during accelerated Weatherometer testing.

VENDOR TEAM

DEWALT
Grinders
(800) 433-9258
www.dewalt.com

GRACO
Spray equipment
PO Box 1441
Minneapolis, MN 55440
(800) 647-4336
www.graco.com

HONDA POWER EQUIPMENT
Power washers
4900 Marconi Drive
Alpharetta, GA 30005
www.hondapowerequipment.com

JELMAR
CLR cleaner
5550 W. Touhy Avenue, Ste. 200
Skokie, IL 60077
(800) 323-5497
www.jelmar.com

MILLER
Safety equipment
1345 15th Street
PO Box 271
Franklin, PA 16323
(800) 873-5242
www.millerfallprotection.com

STIHL
Backpack blowers
(800) 467-8445
www.stihlusa.com

VOLATILE FREE, INC.
Coatings
19500 Janacek Court
Brookfield, WI 53045
(800) 307-9218
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